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PSYX 524.01: Tests and Measurements

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PSYX 524: Tests & Measurement Fall 2018

Course location and time

Skaggs 303
Monday 11:00 am – 1:50 pm

Instructor information

Instructor: Jacqueline A. Brown, Ph.D., NCSP
Office: Skaggs 204
Email: jacqueline.brown@mso.umt.edu
Office hours: By appointment (send me an email to set up)

Course description

This course provides an introduction to educational and psychological measurement. Through lectures, discussion, and individual and group activities, students will learn about the basic concepts, competencies, issues, and tools used in psychological testing and measurement and their practical applications. Specifically, we will review three main areas: 1) theory and principles (e.g., statistical foundations, reliability, validity, item analysis), 2) applications and issues (e.g., test construction and evaluation), and 3) practical elements (e.g., test use in educational and clinical settings). At the conclusion of this course, students will be more knowledgeable about psychological tests and an informed consumer.

Learning Outcomes

At the conclusion of this course, students will be able to:

1. understand some of the history and context surrounding measurement and testing
2. interpret basic statistics used to establish properties of test scores, e.g., measures of central tendency and variability, reliability and validity, and interpreting correlation coefficients
3. interpret test scores, e.g., standard scores, percentile ranks, z-scores, T-scores, age and grade norms, and stanines
4. discuss current assessment tools for measuring achievement, cognition, behavior, and social-emotional functioning
5. know what to consider when constructing, administering, and evaluating tests and surveys
6. relate the quality of measurement to the interpretation of findings and decision-making and communicate the meaning of test scores to students, parents, and educational personnel
7. use assessment information in an ethical and legal manner
8. discuss assessment of students who speak English as a second language

NASP Domains of Practice

Domain 1: Data-Based Decision Making and Accountability
Domain 8: Diversity in Development and Learning

Domain 9: Research and Program Evaluation
Domain 10: Legal, Ethical, and Professional Practice

Corresponding Program Competencies and Objectives

Psychometrics, Measurement, and Research

Students will learn to evaluate test and survey instruments for psychometric properties.
Students will learn to evaluate and utilize research to inform and guide professional practice.

Professional School Psychology

Students will learn to have an understanding of, and ability to practice within legal and ethical responsibilities related to the provision of school psychological services.
Students will have an understanding and awareness of multicultural issues and their impact on student performance as well as the school psychologist-client relationship.
Students will learn to understand the need for cultural competence and awareness.

Required textbooks

Cohen, R. J., & Swerdlik, M. E. (2018). *Psychological testing and assessment: An introduction to tests and measurement* (9th ed.). New York, NY: McGraw Hill.

Harrison, P. L. & Thomas, A. (Eds.). (2014). *Best practices in school psychology VI, Foundations* (6th ed.). Bethesda, MD: National Association of School Psychologists.

Harrison, P. L. & Thomas, A. (Eds.). (2014). *Best practices in school psychology VI, Data-based and collaborative decision making* (6th ed.). Bethesda, MD: National Association of School Psychologists.

Additional readings

The following readings will be available to you in PDF format on Moodle. There may be additional readings assigned during the semester, but you will be provided with them in advance.

Selected readings (The Rights and Responsibilities of Test Takers, The Rights and Responsibilities of Test Users, and Psychological Testing and Assessment) from the following text:

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education (2014). *Standards for educational and psychological testing*. Washington, DC: American Educational Research Association.

Demmert, W. G. (2005). The influences of culture on learning and assessment among Native American students. *Learning Disabilities Research & Practice, 20*, 16-23. doi: 10.1111/j.1540-5826.2005.00116.x

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment, 7*, 286-299. doi: 10.1037/1040-3590.7.3.286

Furlong, M. J., You, S., Renshaw, T. L., Smith, D. C., O'Malley, M. D. (2013). Preliminary development and validation of the Social and Emotional Health Survey for Secondary School Students. *Social Indicators Research, 117*, 1011-1032. doi: 10.1007/s11205-013-0373-0

Hunsley, J., & Mash, E. J. (2007). Evidence-based assessment. *The Annual Review of Clinical Psychology, 3*, 29-51. Doi: <https://doi.org/10.1146/annurev.clinpsy.3.022806.091419>

National Association of School Psychologists (2009). *School Psychologists' involvement in assessment (Position Statement)*. Bethesda, MD: Author.

Penfield, R. D. (2010). Test-based Retention: Does it stand up to professional standards for fair and appropriate test use? *Educational Researcher, 39*, 110-119. doi: 10.3102/0013189X10363007

Required assignments

All written assignments must be completed according to proper APA format.

1. Class discussion and participation (10 points)
Participation in class assignments, activities, discussion, and readings is critical for learning in this course. I expect that you will come to class having read all of the required readings. We will be discussing readings during class and it is expected that you will actively engage in these discussions.
2. Reflection Paper (10 points)
You will write a brief paper (**3 pages double-spaced in 12-point font, with 1-inch margins**) reflecting upon the topic of measurement and its **role in your life AND profession**. You may choose to reflect upon a variety of issues such as your personal experience with standardized testing, the relevant strengths and weaknesses of measurement, and factors influencing testing results. I encourage you to be as creative as possible in your reflection. **No references are required for this paper.**
3. Assessment Construction Group Project (40 points)
In groups, you will develop an assessment (e.g., survey or test) that measures a particular construct. You will present the results of the assessment at the end of the semester. Each student will receive a group grade (30 points) and an individual grade (10 points). Each member of the group will evaluate the other members on timeliness, work ethic, and overall contribution to the group. Detailed information is provided in Appendix A.
4. Final Paper (40 points)
You will complete a final paper comparing the psychometric properties of two tests and evaluating their overall utility. You will need to have the tests you are comparing approved by me before starting your paper. Detailed information is provided in Appendix B. A sample paper is posted on Moodle.

Course grading

Grades are determined based on straight percentages and are as follows:

<u>Percentage</u>	<u>Grade</u>
94 – 100	A
90 – 93	A-
87 – 89	B+
84 – 86	B
80 – 83	B-
77 – 79	C+
74 – 76	C
70 – 73	C-
67 – 69	D+
64 – 66	D
60 – 63	D-
0 – 59	F

Course guidelines and policies

Student Conduct Code

Students entering the field of school psychology are held to a high standard of academic and professional honesty and integrity. The University of Montana Student Conduct Code (SCC) should be reviewed, especially in regards to plagiarism. It is the policy of the SPSY program that plagiarism will result in an “F” for the course in which the academic violation occurs, as well as grounds for consideration of dismissal from the program. The UM administration states: “All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University.” All students need to be familiar with the *Student Conduct Code*. *Please take care to acknowledge your sources, including the Internet, using APA Style.*

Attendance

Regular attendance and active engagement is required for all scheduled classes, as students are responsible for information covered in lectures, handouts, discussions, and activities. Attendance is stressed because students will have opportunities to (a) improve their knowledge through discussions of critical topics and issues, (b) practice skills needed to engage in professional communication with colleagues, (c) obtain information from lectures and presentations, (d) participate in activities, and (e) submit required assignments.

Please inform me prior to class if a late arrival or early departure from class is absolutely necessary. In the case of illness or absence (including religious observances), please send me an email and make arrangements before missing the class. For extended absences due to medical issues, documentation must be provided. Failure to do so may result in penalty. Absence for conferences is not automatically excused. You must be in good standing in the class and make arrangements for assignments before you leave.

Electronic Devices

All electronic devices other than computers must be turned off and put away before class. The use of computers during class to take notes or use electronic articles and PowerPoint

presentations is allowed. However, students may not use any form of social media on their computer while in class or use computers for other personal reasons unrelated to the class content. I will speak to you if I feel your use of computers is interfering with your learning or is a distraction to other students. Inappropriate use of computers will result in a reduction in your participation grade in this course.

Respect for Diversity and Appropriate Language

I am committed to fostering a class environment in which all people will be treated and will be expected to treat others respectfully. People with disabilities or other elements of diversity are first and foremost individual people who should be treated with respect. Language used in assignments and class discussions should be respectful and professional at all times. Please use **“people first”** language in speaking and writing about people with disabilities or other elements of diversity. For example, please avoid phrases such as “the handicapped,” “LD kid,” “autistic child” or other statements that emphasize the disability or other elements of diversity first, rather than the individual. Pejorative terms and threatening or harassing language have no place in a respectful professional discussion or in your assignments.

Disability Modifications

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and [Disability Services for Students](#). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or call 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

Assignment expectations

Students are expected to submit assignments at or before the assigned due date (no later than the end of class). Prior notification is required for excused or late assignments. Unexcused assignments submitted after the due date will be penalized by a reduction of **five points per calendar day** late. It is the student’s responsibility to ask questions when information required in the assignments or discussed in class is unclear. There will be no make-up or extra-credit assignments.

The instructor reserves the right to modify or substitute coursework, including readings and assignments, during the course to enhance learning. These changes will not result in a substantially increased workload or decreased opportunities to earn points, but will instead likely benefit students.

Course Schedule

The course schedule is subject to minor adjustments, as determined by the instructor.

Date	Topics	Required Readings	Assignment
August 27	Introductions and Course Syllabus; Overview of Psychological	Cohen & Swerdlik Chapter 1	

	Testing		
September 3	Labor Day—NO CLASS		
September 10	Importance and Applicability of Psychological Testing; History of Psychological Testing	Cohen & Swerdlik Chapter 2 NASP (2009) Position Statement	
September 17	Psychological Test Use Ethical & Legal Considerations	Standards for Educational and Psychological Testing (p. 131-168)	
September 24	Interpreting Test Scores	Cohen & Swerdlik Chapter 3 & 4	Reflection Paper Due
October 1	Test Reliability	Cohen & Swerdlik Chapter 5	Final Paper Topic Due
October 8	Test Validity	Cohen & Swerdlik Chapter 6	
October 15	Test Utility and Factor Analysis	Cohen & Swerdlik Chapter 7 Floyd & Widaman (1995)	Assessment Construction Project Topic Due
October 22	Test Development (Construction and Evaluation) <i>Work on Assessment Construction Project</i>	Cohen & Swerdlik Chapter 8 (p. 229-247) Furlong et al. (2013)	
October 29	Assessing the Psychometric Quality of a Test	Cohen & Swerdlik Chapter 8 (p. 248-272)	
November 5	Issues of Culture in Testing and Assessment	Demmert (2005) Best Practices in School Psychology VI, Foundations Ch. 5 (p. 61)	
Date	Topics	Required Readings	Assignment
November 12	Material Review <i>Work on Assessment Construction Project and Complete Review Worksheet in class</i>	None Assigned	Final Paper Due

November 19	Using Tests in School and Applied Psychology: Overview	Penfield (2010) Hunsley & Mash (2007)	
November 26	Using Tests in School and Applied Psychology: Specific Disorders	Best Practices in School Psychology VI, Data-Based and Collaborative Decision Making Ch. 25 (p. 391) AND Ch. 27 (p. 417)	
December 3	Assessment Construction Project Presentations	None Assigned	Assessment Construction Project Report Due
December 18	Final Exams- No class		

Appendix A:

Assessment Construction Group Project

One of the best ways of understanding assessment and psychometrics is to create an assessment. The purpose of this project is to work collaboratively with your colleagues in creating a short assessment of a particular construct.

You will have some time in class to complete the project, but the majority of the work should be done outside of class.

Working in small groups, you will:

1. **Choose a construct to measure.**

As a group, determine what construct you would like to measure. You may choose to measure achievement, aptitude or personality. Remember, simple is sometimes better! You must have my approval prior to beginning the project.

2. **Research the construct and its measurement.**

As a group, conduct a thorough examination of how this construct has been measured in the past. For example, if you are examining self-esteem, you should look carefully at how “self-esteem” has been conceptualized and measured. In your presentation, you will need to present the history of the construct, the assessments available, and then provide an analysis and critique of these assessments.

3. **Develop an item pool.**

Once you have researched the construct, develop a pool of potential items that could measure that construct (**approximately 20-25 initial items is sufficient**). As a group, discuss whether these items adequately measure the construct. You should also include information on how you went about constructing your test and why (e.g., include a rationale for the item format, types of items chosen). Please see the below questions for additional information. You will also engage in peer review of each other’s items during class to determine what items should be kept, eliminated, and revised, although you will not be required to calculate the CVR (content validity ratio). You should have **approximately 15-20 items in your final scale**.

Questions you should ask are:

- What should you do about redundant or ambiguous items?
- Which items should be in the final scale?
- What specific formula should you use for estimating reliability?

4. **Collect data and perform analyses.**

Give your assessment to a group of volunteers (other graduate or undergraduate students, family members, friends). Each team member should be responsible for administering a set of surveys. Analyze the results of the assessment and conduct some item analyses, as appropriate. This should include inter-item correlations, item-total correlations, and possibly item discrimination (Note: item discrimination may not be

relevant for every test created). In doing this, you will be providing a summary of the final items selected for the scale, with an explanation of the criteria used by the team for item inclusion (item analysis, issues of test/item bias, response bias). Calculate the scale reliability (internal consistency and interpretation of it) and discuss potential issues of test bias (construct bias, method bias, differential item bias), response bias (social desirability, acquiescence, random responding, and faking), and validity (face validity). Finally, you are expected to conduct basic univariate analyses, providing the mean, standard deviation, and frequency of your collected responses (i.e., of the items themselves and not the correlations).

***Please Note:** You will be required to transfer your item responses collected through Qualtrics to an SPSS database, to enable you to calculate many of the above-described calculations. This may require some time to sort through the information and figure out the appropriate calculations.

5. Present your project.

As a team, you will present the project to the rest of the class. You will have approximately 30 minutes to share your project and 10 minutes to answer questions and initiate a discussion with your peers. ***You will be providing me with a copy of your PowerPoint presentation, in addition to the final items chosen for your scale, to be used for grading, so please make sure that the essential information is included on your slides. The final items can be included on your slides or on a separate handout for me.*** In general, the presentation should follow this format:

- The objective of the assessment
- History and explanation of the construct and assessment of the construct
- Analysis and critique of current assessment instruments available that measure this construct (include information detailed in #2: Research the construct and its measurement)
- An explanation of why the particular method of scale construction was chosen
- Information on the Method section, describing the sample of raters or judges used to develop the scale, the materials used, and the procedure used to collect the ratings or judgments. Include all statistical analyses that were used to construct the scale.
- Final items selected for the scale with an explanation of the criteria used by the team for item inclusion (include information detailed in #3: Develop an item pool)
- Reliability, Validity, and Item Analyses information (include information detailed in #4: Collect data and perform analyses)
- Suggestions for next steps to determine reliability and validity of scale (general suggestions on how you may wish to improve your scale in the future)

As a group, you will be evaluated on several criteria:

- Comprehensive summary of construct and history of assessment of construct
- Appropriateness of items
- Appropriate use of statistical analyses
- Depth of discussion on reliability, validity, test and response bias
- Incorporation of all team members in presentation

- Use of visual aides and examples
- Clarity and organization of presentation

Each team member will also be evaluated by other team members. You will be evaluated on the following criteria:

- Attendance at team meetings
- Timeliness in completing tasks
- Overall work ethic
- Overall contribution to the team

Appendix B:

Final Paper

The main purpose of this research paper is to evaluate two measures of a construct and select the best one. This assignment is designed to examine how well you can apply the knowledge you have acquired about basic principles of measurement to this task. Select a construct and two measures of that construct. You are required to receive approval on your tests and construct before proceeding.

Please note: The purpose of this paper is not solely to summarize this information. It is to present it in a way that enables you to reflect critically on two measures and their utility in practice. Papers that solely summarize the below information without engaging in critical reflection will be given lower grades. An example of a good paper is posted on Moodle. Please note that an in-depth reflection is required overall, so please make sure to critically reflect upon the information that you present (e.g., reliability, validity, implications of missing information, etc.). **Also, please include headings in your paper based on the below sections (Scenario, General Descriptive Information, etc.)**

Papers must be no more than 10 pages (not including title page or references), double-spaced, using 1-inch margins, using 12-point Times New Roman font.

You are expected to obtain information from a variety of sources, such as test manuals, journal articles, PSYC INFO and/or Google Scholar, books, and reference guides. These sources need to be appropriately cited using APA style (6th edition). You can obtain a total of **2 points** for inclusion of a variety of relevant references and proper APA citation.

Please address the following sections and questions in your paper:

1. *Scenario:*

What is your construct of interest and the two measures you will be comparing? Provide a *brief* scenario (maximum of five sentences) for which you need this measure. Include in the scenario your sample, context, and the reason for measuring the construct.

Once you have selected your tests, you should supply the following information for each test. These questions have been taken from Miller et al. (2013) "*Foundations of Psychological Testing: A Practical Approach.*"

2. *General Descriptive Information (5 points)*

- What is the title of the test?
- Who is the author of the test?
- Who publishes the test and when was it published (include dates of manuals, norms, and supplementary materials)?
- How long does it take to administer the test?
- How much does it cost to purchase the test (cost of test, answer sheets, manual, scoring services, etc.)?

3. *Purpose and Nature of the Test (5 points)*
 - What does the test measure (include scales)?
 - What does the test predict?
 - What population was the test designed for (e.g., age, type of person)?
 - What is the nature of the test (e.g., behavioral observation, self-report, standardized or non-standardized, objective or subjective)?
 - What is the format of the test (e.g., paper-and-pencil or computer, multiple choice or true/false)?

4. *Practical Evaluation (7 points)*
 - Is the test manual comprehensive (does it include information on how the test was constructed, reliability and validity, composition of norm groups; yes/no summary only- in depth information and reflection should be provided in the next section)?
 - Is the test easy or difficult to administer?
 - How clear are the administration guidelines?
 - How clear are the scoring procedures?
 - What qualifications and training does a test administrator need to have?
 - Does the test have face validity?

5. *Technical Evaluation (15 points)*
 - Is there a norm group?
 - Who comprises the norm group?
 - What types of norms are there (e.g., percentiles, standard scores)?
 - How was the norm group selected?
 - Are there subgroup norms (e.g., by age, gender, religion)?
 - What is the estimate of the test's reliability?
 - How was reliability determined?
 - What is the evidence for the validity of the test?
 - How was the evidence for validity gathered?
 - What is the standard error of measurement?
 - What are the confidence intervals?

6. *Summary Comments (3 points)*

Give a summary statement of the design and content of each test, including with whom each test is designed to be used. Comment briefly on the adequacy of the test as a measure of what it was designed to measure. Based on the information previously provided in your paper, what do you see as being the strengths and weaknesses of each test? What further information and/or data are needed to improve the test and its uses? (*Note: This is a summary. All key information – and no new information – should be provided here*).

7. *Recommendation (3 points)*

What is your recommendation as to which test you should use? Please give a strong rationale for your recommendation. You may wish to tie this section back to your scenario if applicable.

Suggestions for Constructs and Measures

Below are possible ideas of constructs and measures to use in your paper. These are *merely examples and not mandatory*. Feel free to choose another construct/measure that may be of interest to you. If you choose a general test that measures multiple areas (e.g., multiple cognitive abilities, externalizing and internalizing behaviors, or areas of achievement), I strongly recommend that you focus on one area within these tests (e.g., reading only instead of reading, writing, and math), as otherwise the task will become too complicated and complex. Regardless of what construct you choose, make sure that there is enough information available on it to complete the paper. I highly recommend reviewing the necessary questions and available resources when picking your topic. Please choose a measure that you have access to sufficient information to complete the paper (e.g., manual, sufficient articles online, Mental Measurement Yearbook reviews)

Cognition

Wechsler Intelligence Scales for Children (4th edition); Stanford-Binet Intelligence Scale (5th edition); Woodcock-Johnson Tests of Cognitive Abilities; Kaufman Assessment Battery for Children

Achievement:

Wechsler Individual Achievement Test; Woodcock Johnson Tests of Achievement; Kaufman Test of Educational Achievement

Depression:

Beck Depression Inventory for Youth; Reynolds Child/Adolescent Depression Scales; Child Depression Inventory

Anxiety:

State-Trait Anxiety Inventory for Children; Beck Anxiety Inventory for Youth; Revised Children Manifest Anxiety Scale

Self-Esteem

Coopersmith Self-Esteem Inventory; Rosenberg Self-Esteem Scale

Self-Concept

Piers-Harris Children's Self-Concept Scale; Tennessee Self-Concept Scale; Self-Description Questionnaire